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### 1 [Fast Secure Processor for Inhibiting Software Piracy and Tampering](#)

Jun Yang, Youtao Zhang, Lan Gao

 December 2003 **Proceedings of the 36th annual IEEE/ACM International Symposium on Microarchitecture**

Publisher: IEEE Computer Society

 Full text available: pdf(258.88 KB) Additional Information: [full citation](#), [abstract](#), [citations](#), [index terms](#)

Due to the widespread software piracy and virus attacks, significant efforts have been made to improve security for computer systems. For stand-alone computers, a key observation is that other than the processor, any component is vulnerable to security attacks. Recently, an execution only memory (XOM) architecture has been proposed to support copy and tamper resistant software [18, 17, 13]. In this design, the program and data are stored in encrypted format outside the CPU boundary. The decryption is ca ...

### 2 [Virtual machine monitors: Implementing an untrusted operating system on trusted hardware](#)

David Lie, Chandramohan A. Thekkath, Mark Horowitz

 October 2003 **Proceedings of the nineteenth ACM symposium on Operating systems principles**

Publisher: ACM Press

 Full text available: pdf(280.87 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Recently, there has been considerable interest in providing "trusted computing platforms" using hardware~---~TCPA and Palladium being the most publicly visible examples. In this paper we discuss our experience with building such a platform using a traditional time-sharing operating system executing on XOM~---~a processor architecture that provides copy protection and tamper-resistance functions. In XOM, only the processor is trusted; main memory and the operating system are not trusted. Our opera ...

**Keywords:** XOM, XOMOS, untrusted operating systems

### 3 [Virtual machine monitors: Terra: a virtual machine-based platform for trusted computing](#)

Tal Garfinkel, Ben Pfaff, Jim Chow, Mendel Rosenblum, Dan Boneh

 October 2003 **Proceedings of the nineteenth ACM symposium on Operating systems principles**

Publisher: ACM Press

 Full text available: pdf(140.31 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We present a flexible architecture for trusted computing, called Terra, that allows

applications with a wide range of security requirements to run simultaneously on commodity hardware. Applications on Terra enjoy the semantics of running on a separate, dedicated, tamper-resistant hardware platform, while retaining the ability to run side-by-side with normal applications on a general-purpose computing platform. Terra achieves this synthesis by use of a *trusted virtual machine monitor* (TVMM ...

**Keywords:** VMM, attestation, authentication, trusted computing, virtual machine, virtual machine monitor

#### 4 Workshop on architectural support for security and anti-virus (WASSA): ChipLock:



##### support for secure microarchitectures

Taeho Kgil, Laura Falk, Trevor Mudge

March 2005 **ACM SIGARCH Computer Architecture News**, Volume 33 Issue 1

**Publisher:** ACM Press

Full text available: pdf(256.52 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The increasing need for security has caused system designers to consider placing some security support directly at the hardware level. In fact, this is starting to emerge as an important consideration in processor design, because the performance overhead of supporting security in hardware is usually significantly lower than a complete software solution. In this paper, we investigate integrating some security support into hardware. We show that security support can be added at some acceptable cos ...

#### 5 Mondrix: memory isolation for linux using mondriaan memory protection



Emmett Witchel, Junghwan Rhee, Krste Asanović

October 2005 **ACM SIGOPS Operating Systems Review , Proceedings of the twentieth ACM symposium on Operating systems principles SOSP '05**, Volume 39 Issue 5

**Publisher:** ACM Press

Full text available: pdf(332.09 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper presents the design and an evaluation of Mondrix, a version of the Linux kernel with Mondriaan Memory Protection (MMP). MMP is a combination of hardware and software that provides efficient fine-grained memory protection between multiple protection domains sharing a linear address space. Mondrix uses MMP to enforce isolation between kernel modules which helps detect bugs, limits their damage, and improves kernel robustness and maintainability. During development, MMP exposed two kerne ...

**Keywords:** fine-grained memory protection

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